honour to his memory by the unveiling of a memorial window, which has been contributed by members of the five engineering Societies with which Sir W. Siemens was associated in the Abbey. The day was chosen as being the second anniversary of the funeral service which was held in the Abbey previously to the interment of the great *savant* at Kensal Green Cemetery.

Among those present were Mr. Arnold Siemens, Miss Gordon, Dr. Werner Siemens, and Mr. Alexander Siemens. Of the Civil Engineers Sir Frederick J. Bramwell, F.R.S., President, Sir Charles H. Gregory, K.C.M.G., Mr. Bateman, F.R.S., Mr. Barlow, F.R.S., Sir J. W. Bazalgette, C.B., Mr. Preece, F.R.S., Sir R. Rawlinson, C.B., and others, besides representatives of other Societies, among them Admiral Sir R. Spencer Robinson, K.C.B., Dr. Percy, F.R.S., Sir Bernhard Samuelson, Sir Henry Bessemer, F.R.S., Prof. W. G. Adams, Sir F. A. Abel, C.B., Prof. D. E. Hughes, F.R.S., Prof. Ayrton, F.R.S., and Dr. Hopkinson, F.R.S.

The Dean opened the proceedings by a brief address. "It is not for me," he said, "to dwell for a moment on the signal services to the cause, not only of science, but still more the application of science to the well-being of mankind, that will be always associated with the name of Sir W. Siemens. But I may add my own personal testimony to the impression which the character of your friend and leader, for such in a wide range of subjects I may surely call him, made on all who came into contact with him. He was, as you know, and as I know, not only admired and honoured, he was beloved and deplored. May the window which we shall now uncover do its proper work. . . . And may it remind us and far-off generations of the achievements and character of him whose memory will henceforth be here linked with that of his illustrious brethren, whose names the floor on which we shall soon stand, and the walls beneath which we shall pass, proclaim and preserve—the Newton, the Herschel, and the Darwin, the Stephenson, the Locke, and the Brunel, the Barry, to which add the Gilbert Scott, and Street—who sleep, or are honoured hard by."

Sir F. Bramwell, who spoke as the President of the Civil Engineers, the senior of the Societies represented, then made some remarks on Sir W. Siemens's contributions to applied and pure science.

The window, which has been designed and executed by Messrs. Clayton and Bell under the direction of Mr. J. L. Pearson, is intended to illustrate the maxim "Laborare est orare." It consists of two lights with a sixfoil in its traceried head. Each of these lights is composed of three panels in vertical order. In the left-hand light appear ironsmiths, chemists, and agriculturists; in the other groups in corresponding positions show astronomers, artists, and the professor with his scholars. Between these groups are in all cases angels bearing labels inscribed with the words giving the key-note of the conception—namely, "Laborare est orare." In the sixfoil at the head of the window is a representation of the sun as the source of light, surrounded by the words, "Dixit autem Deus fiant luminaria in firmamento cœli," and by the various heavenly bodies from which light emanates or is reflected. At the base is the following inscription:—"In memory of Charles William Siemens, Knt., D.C.L., LL.D., F.R.S., Civil Engineer. Born 4 April, 1823; died 19 November, 1883. Erected as a tribute of respect by his brother Engineers."

NOTES

It is gratifying to be able to announce that a pension of 300*l*. a year has been conferred upon Prof. Huxley from the Civil List Fund. We are also much pleased to notice the admirable articles in the *Times* and other papers on the retirement of Sir Joseph Hooker and Prof. Huxley, indicating, as they certainly do, the general growth of scientific interest.

We regret to learn of the death, in his 72nd year, of Prof. Thomas Andrews, F.R.S., the eminent chemist. We hope to be able to refer to his work in detail in our next number.

Botanists all the world over, we are sure, will he glad to learn that Mr. W. T. Thiselton Dyer, C.M.G., F.R.S., has been nominated to succeed Sir Joseph Hooker in the Directorship of Kew Gardens.

Our Paris Correspondent informs us of the death of M. Bouley, President of the Paris Academy of Sciences, who was to have held office until the first meeting of 1886. M. Bouley, who was born in Paris in 1814, died of heart disease, under which he had been labouring for many years. He was, during many years, Director of the Veterinary School of Alfort. He has published a large number of memoirs on physiological researches, and was a popular writer and an eloquent debater.

The reports of observations of the total eclipse of the sun of August 7, 1869, made by parties under the direction of Prof. Coffin, Superintendent of the *American Nautical Almanac*, have recently been published by the authority of the Secretary of the Navy. All lovers of astronomy will regret to know that this late publication in full of observations made sixteen years ago is due to the failing health and sickness of Prof. Coffin. This is, however, the less to be regretted since pretty full reports were made by the individual observers at the time, and the important observations secured have in this way found their place among the records of eclipse phenomena. The illustrations which accompany the volume are very beautiful.

We have received No. 15 of the professional papers of the Signal Service of the United States Army, containing a full account of Prof. Langley's researches on solar heat and its absorption by the earth's atmosphere, undertaken during, and in connection with, the Mount Whitney Expedition. Prof. Langley has already himself given an account in Nature of the important results he thus obtained. A perusal of the volume, however, shows that all who are interested in this subject will do well to refer to the present volume and the more detailed accounts they will find there touching the various parts of the research. It is a monument of industry and skill and undaunted perseverance of which Prof. Langley may well be proud.

The Christmas Lectures at the Royal Institution will be given by Prof. Dewar, on "The Story of a Meteorite" (with experimental illustrations), commencing on December 29. Courses of lectures will probably be given before Easter by Prof. R. S. Ball, Mr. R. S. Poole, Mr. C. T. Newton, Dr. A. Gamgee, Mr. W. C. Roberts-Austin, Prof. Boyd Dawkins, Prof. Tyndall, Mr. A. Geikie, Rev. C. Taylor, Mr. E. B. Poulton, and Mr. H. Grubb. The Friday Evening Meetings will begin on January 22, when a discourse will be given by Prof. Tyndall. Succeeding discourses will probably be given by Sir William Thomson, Mr. T. P. Teale, Prof. O. Reynolds, Mr. W. K. Parker, Mr. A. A. Common, Prof. A. Macalister, Mr. R. S. Poole, Mr. W. H. M. Christie, Mr. W. Anderson, Sir Henry Roscoe, and others.

The curriculum of the Paris School of Ethnology (founded by M. Broca in 1876) for the current session embraces courses of lectures on zoological, general, and prehistoric anthropology, ethnology, medical geography, and the history of civilisation. The course on linguistic anthropology does not commence until the spring. On zoological anthropology Dr. Duval will lecture on anthropogeny and comparative embryology: the blastoderm and the first phases of development. In general anthropology, Dr. Topinard will take type and race: the first part analytical—the races of Europe from prehistoric times down to our own days; the second part synthetical—the succession and transformation of races, their past and future. In ethnology, Dr. Dally will take ethnical craniology; in prehistoric anthropology, M. Mortillet takes Tertiary man; and in the history of civilisations, Dr. Lebourneau will lecture on the evolution and ethnography of morality.

WE have received the price list of the publications of the Smithsonian Institution up to July last. It includes only such publications from 1847 to the present year as can be supplied, all others being out of print. The latter are very numerous, for of the first hundred publications only forty-six are now to be procured, the remaining sixty-four being out of print. The list first gives the papers according to their numbers in the publication catalogue of the Institution, then according to the authors, then according to their subjects, and finally they are arranged under heads according to their mode of publication, such as "Annual Reports," "Contributions to Knowledge," "Proceedings of Societies," &c.

TELEPHONIC communication between Paris and Rheims was opened to the public on Tuesday. The distance is 172 kilometres, but the electric resistance to be overcome between the two points is estimated at 217 kilometres. The ordinary telegraphic wire is utilised for the purpose, but there is a special telephonic station in the Plain of St. Denis, at the Pont de Soissons. The tariff is one franc for five minutes' conversation. At the inaugural *séance*, conversations were held with sundry public functionaries at Rheims, whose voices were heard with perfect distinctness.

PROF. DU BOIS-REYMOND, it is known, has recently availed himself of good opportunities for studying the electric ray in the live state; and among several important facts elicited by him is that of irreciprocity of conduction in the electric organ. That is, when short currents are passed through the organ in the same direction as that of the animal's proper current, viz. from belly to back, and in the reverse direction, the conductivity in the former case is considerably greater. This irreciprocity begins to appear only when the current has acquired a certain strength; it increases with the strength, but more slowly. Both this irreciprocity and the small conductivity of the organ (which is considerably less than that of sea water) are proved to be connected with the life of the animal; the former disappears and the latter increases in the case of spontaneous death. The former depends also on the duration of the current, diminishing with a continuous current. This phenomenon of irreciprocity appears to have the effect of strengthening the animal's current and so intensifying its physiological action in external space. The author's researches on the subject have been recently laid before the Berlin Academy (*Sitzungsberichte*, Berlin Academy, 1885, p. 691).

THE fresh-water mussel, it is known, closes its shell by contraction of two strong muscles—one before and one behind; but how does it open its shell? This question has recently been studied by Herr Pawlow (*Pflüger's Archiv*). The animal (*Anodonta cygnæa*) was fixed on a board by one shell, while the other free shell was connected by means of a silk thread with the short arm of a lever, the longer arm of which indicated the movements on a slowly-rotating drum. The nerves were variously irritated; but without giving details we may say that Herr Pawlow finds there are two classes of nerve-fibres connected with the muscles—the one motor, producing contractions; the other inhibitory, producing relaxation. The motor nerves for each muscle spring from the ganglion next it; the inhibitory fibres all proceed from the two front ganglions. The posterior ganglion can thus only send an impulse of movement to the posterior closing muscle, while the front ganglions, besides being thus related to the front muscle, can also produce relaxation in both muscles. When separated from the ganglions belonging to them the muscles pass but very slowly from the contracted to the relaxed state. A remarkable fact, noted by Herr Pawlow, is that by stimulation of the nerves in the muscles contraction does not always follow, but sometimes relaxation. Such phenomena are rare; they have been observed in the blood-vessels, and Herr Biedermann has noticed them in the heart of the snail.

THE hatching of fish-ova has commenced at the establishment of the National Fish-Culture Association, South Kensington, several agents having been employed lately to artificially spawn fish, which in many parts are well forward. The species chiefly operated upon have been the *Salmo fario* and *S. levenensis*. The American Government have promised to forward large consignments of ova from the various species of Salmonidæ abounding in their waters, particularly the whitefish, whose eggs will be incubated in very large numbers by the Association.

THE telegraph system of the Great Northern Telegraph Company has been extended to Seoul, the capital of Corea, and to its port, Jenchuan, or Chemulpo. These two places are therefore in telegraphic communication with the rest of the world.

A WRITER in the *North China Herald*, on ethnology in China, points out that while there have been geologists, botanists, and zoologists in China, no one has yet given himself specially to ethnology who was already distinguished in it. The province of Szechu'en is a very interesting and important region for the work of the ethnological geographer, because of the Thibetan tribes, the Lolos, and others located there. In the historical ethnology of China, De Guignes led the way in the last century in his "History of the Huns," which unfortunately were not the real Huns, for the Huns of Hungary were not, as he supposed, the powerful race known in China as the Hiung Nu. Yet he did much in elucidating the history of all the Tartar races, and his great merit was that he collected a large store of historic facts from Chinese sources, from the second century B.C., when the Chinese began to know Tartary, down to the days of the Mongol conquest. Klaproth settled the point who the Hiung Nu really were by the simple method of taking the words mentioned as theirs by Chinese authors, and finding out to what linguistic stock they belonged. Besides making this step forward, Klaproth also tabulated the facts of Chinese history relating to all Asiatic races.

WHAT remains to be done for ethnology in the field of Chinese history is, the same writer adds, by no means a small amount of work. It is possible to trace the Indo-European races mentioned by ancient Chinese authors, and follow them in their movements westward, from Kansu to the Tsemgling mountains, and beyond, where at Bokhara and Kunduz they meet with other Indo-European stocks. In the north-west, besides these, Chinese history introduces us to several Indo-European peoples, occupying before the birth of Christ the country around the Sea of Aral, from which the Germanic races appear to have moved westward. The Chinese tell us nothing of the first emigrants, the Cimbri and Celts, but they give very considerable information about the Germanic races, the value of which has not yet been fully appreciated. Then the Huns, Avars, and Turks went forward, and the facts respecting them in Chinese history are, taken altogether, more abundant than upon any other foreign stock of nations. "Hence there is every inducement for the historical ethnologist to study Chinese history carefully."

MESSRS. MACMILLAN AND CO. will publish immediately a work on the "Elements of Thermal Chemistry," by Mr. M. M. Pattison Muir, assisted by Mr. D. M. Wilson. It is intended to present a connected account of the methods and results of the most important researches in the subject. Dealing rather with principles than with details, it is adapted for the use of students with a fair knowledge of the principles of Chemistry and the outlines of the study of Energy. The book is divided into two parts—the first devoted to the statement and consideration of the various branches of thermal chemistry; the second comprising most of the data on which the science is built. These data are classified and tabulated in five appendices, which it is hoped will prove of considerable service to students.

A NEW and thoroughly revised edition of Mr. H B. Woodward's "Geology of England and Wales" is announced. The author has devoted nearly all his leisure hours since 1876 to the preparation of it, sparing no pains to render it as complete and accurate as possible. While giving prominence to the general description of the rocks, their leading fossils, and economic products, some details will be inserted to show the chief variations of the strata when traced across the country. Numerous tables and diagrams will also be given, to show the relations of the larger groups and of the local and minor divisions of each series of stratified rocks. The history of each rock-name, and its synonyms, so far as possible, will be briefly noted. The endeavour is made to explain every local rock-name, as well as the terms applied to particular beds or zones of fossils. The account of the geology of the principal lines of railway will be very much enlarged. The book will be published by subscription. Mr. Woodward's address is 7, Kelvin Terrace, Highbury Park, N.

THE additions to the Zoological Society's Gardens during the past week include a Levaillant's Cynictis (*Cynictis levaillanti* ♂) from South Africa, presented by Mr. W. Hope; a Yellow-footed Rock Kangaroo (*Petrogale xanthopus* ♀), a Wedge-tailed Eagle (*Aquila audax*) from Australia, presented by Mr. G. T. Wills; a Cape Buffalo (*Bubalus caffer* ♂) from South Africa, presented by Mr. J. Gorton; two Cape-crowned Cranes (*Balearica chrysopelargus*) from South Africa, presented by His Excellency Sir Henry E. Bulwer, G.C.M.G.; a Goshawk (*Astur palumbarius*), European, presented by Mr. W. H. St. Quintin; an Indian Kite (*Milvus govinda*) from India, presented by Mrs. E. C. Mathews; a Cerastes Viper (*Vipera cerastes*) from Moses' Well, Arabia, presented by Lieut.-Col. G. W. Smith; two Moose (*Alces machlis* ♂ ♀) from Norway, a Blue and Yellow Macaw (*Ara ararauna*), a Red and Yellow Macaw (*Ara chloroptera*) from South America, four Gold Pheasants (*Thaumalea picta* ♂ ♂ ♀ ♀) from China, deposited; two Ring-tailed Lemurs (*Lemur catta* ♂ ♂) from Madagascar, two Aldrovandi's Skinks (*Plestiodon auratus*) from North-West Africa, purchased; three Lions (*Felis leo*), born in the Gardens.

OUR ASTRONOMICAL COLUMN

THE DEARBORN OBSERVATORY.—Prof. Hough's report to the Directors of the Chicago Astronomical Society is as usual chiefly occupied with the observations of Jupiter which have been made with the great refractor. The great red spot still forms, of course, the object of greatest interest. The curious filling up which it underwent last February, whereby for a time it presented the appearance of a reddish elliptical ring, with a white centre, is described, and also its gradual return to its normal appearance. The red spot has now been watched for seven years, and during that time its latitude, shape, and size have undergone but little change. The length, however, appears to have diminished slightly in 1884 as compared with 1883, Prof. Hough's measurements being 12″·29 for 1883, and 11″·26 for 1884. The breadth, on the other hand, seems somewhat greater, so that it is less markedly elliptical than in former years. The mean rotation period for the interval 1884 September 25 to 1885 June 29 was found to be 9h. 55m. 40·4s., or somewhat greater than in previous years. "The depression in the equatorial belt under the red spot, which was formed in 1882, has continued, but is gradually being obliterated." "The principal equatorial white spot which has been observed since 1879 was not so conspicuous as in former years." The old rotation value, 9h. 50m. 9·8s., satisfied the observations.

Of other observations the principal recorded are the discovery of thirty-nine new double stars, an observation of the companion to Sirius, 1885·195, Dist. = 7″·96, Posn. Angle = 32°·7, and a series of photographs of the sun taken during the partial eclipse of 1885 March 16. Prof. Hough describes a printing chronograph which he has had constructed, and which records at once the time of an observation to the hundredth of a second, and obviates the labour now necessary to convert the ordinary chronographic record into numbers. He estimates the pecuniary value of this labour in a first-class observatory as at least 200*l.* annually.

ASTRONOMICAL PHENOMENA FOR THE WEEK, 1885, DECEMBER 6–12

(FOR the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on December 6

Sun rises, 7h. 53m.; souths, 11h. 51m. 22·3s.; sets, 15h. 50m.; decl. on meridian, 22° 34′ S.: Sidereal Time at Sunset, 20h. 52m.

Moon (New) rises, 7h. 18m.; souths, 11h. 51m.; sets, 16h. 21m.; decl. on meridian, 17° 34′ S.

Planet	Rises	Souths	Sets	Decl. on meridian
	h. m.	h. m.	h. m.	° ′
Mercury ...	9 36 ...	13 18 ...	17 0 ...	24 55 S.
Venus ...	11 16 ...	15 17 ...	19 18 ...	22 12 S.
Mars ...	23 11* ...	6 0 ...	12 49 ...	8 48 N.
Jupiter ...	1 8 ...	7 12 ...	13 16 ...	0 5 S.
Saturn ...	17 19* ...	1 28 ...	9 37 ...	22 25 N.

* Indicates that the rising is that of the preceding day.

Occultations of Stars by the Moon

Dec.	Star	Mag.	Disap.	Reap.	Corresponding angles from vertex to right for inverted image
			h. m.	h. m.	° °
11 ...	18 Aquarii ...	6 ...	20 31 ...	21 30 ...	166 306
12 ...	B.A.C. 7697 ...	6½ ...	17 56 ...	18 56 ...	88 355

Phenomena of Jupiter's Satellites

Dec.	h. m.		Dec.	h. m.	
6 ...	5 19	I. tr. ing.	10 ...	4 27	II. ecl. disap.
6 ...	7 35	I. tr. egr.	10 ...	5 26	IV. tr. ing.
7 ...	1 31	I. ecl. disap.	10 ...	7 30	IV. tr. egr.
7 ...	4 56	I. occ. reap.	12 ...	1 59	II. tr. ing.
8 ...	2 4	I. tr. egr.	12 ...	4 47	II. tr. egr.

The Occultations of Stars and Phenomena of Jupiter's Satellites are such as are visible at Greenwich.

Saturn, December 6.—Outer major axis of outer ring = 46″·2: outer minor axis of outer ring = 20″·1: southern surface visible.

Dec.	h.	
8 ...	6 ...	Mercury in conjunction with and 6° 3′ south of the Moon.
9 ...	7 ...	Venus at greatest elongation from the Sun, 47° east.
9 ...	15 ...	Mercury stationary.
10 ...	23 ...	Venus in conjunction with and 5° 56′ south of the Moon.

Variable Stars

Star	R.A.	Decl.	Epoch	Phase
	h. m. s.	° ′	h. m.	
U Cephei...	0 52 8 ...	81 15·3 N. ...	Dec. 9, 2 46 ...	*m*
Algol ...	3 0 41 ...	40 30·7 N. ...	Dec. 7, 19 46 ...	*m*
λ Tauri ...	3 54 19 ...	12 9·9 N. ...	Dec. 9, 17 54 ...	*m*
S Cancri ...	8 37 22 ...	19 26·8 N. ...	Dec. 12, 4 52 ...	*m*
X Sagittarii	17 40 19 ...	27 47·1 S. ...	Dec. 8, 21 30 ...	*m*
η Aquilæ ...	19 46 37 ...	0 42·7 N. ...	Dec. 7, 7 0 ...	*M*
			,, 12, 2 30 ...	*m*
δ Cephei ...	22 24 54 ...	57 49·6 N. ...	Dec. 7, 1 0 ...	*M*
			,, 10, 20 30 ...	*m*

M signifies maximum; *m* minimum.